Synthese der 4-Deoxy-D-lyxo-hexose-Derivate und Untersuchung zur Synthese des Makrolid-Antibiotikums „LL-Z 1640-2“

In this dissertation several efficient routes for the synthesis of 4-deoxy-D-lyxo-hexoses were proposed and studied. The utility of 4-deoxy-D-lyxo-hexose derived building blocks for synthesis of the macrolide LL-1640-2 was investigated.

In Chapter 1 of this dissertation the effective synthesis of differently protected 4-Deoxy-D-lyxo-hexoses (4-deoxy-D-mannoses) was described. Derivatives of 4-deoxy-hexoses were recognized as a part of oligosaccharides and antibodies; there are useful tools in the study of biological and biochemical properties. 4-Deoxy-D-lyxo-hexose is an important starting material in natural product synthesis. It was also applied for the synthesis of hemibrevetoxin, myxovirecin B, neosidomycin, and SF-2140.

4-Deoxy-D-lyxo-hexose is not commercially available. Two efficient routes, amenable to larger scale, for the synthesis of 4-deoxy-D-lyxo-hexose derivatives are proposed. In the first procedure, 4-deoxy-D-lyxo-hexoses were synthesized from a glucal derivate via allylic deoxygenation and asymmetric dihydroxylation. In the second procedure, 4-deoxy-D-lyxo-hexoses were prepared via direct deoxygenations at C-4.

In Chapter 2 of this dissertation the synthesis of the macrolide LL-1640-2 was studied from 4-deoxy-D-lyxo-hexose as a chiral building block. The LL-1640-2 is high specific inhibitor of tyrosine protein kinases. The utility of tyrosine kinase inhibitors for the treatment of a cancer, pulmonary fibrosis, psoriasis and other disorders has been demonstrated in a number of *in vivo* studies.

A new synthetic route to LL-1640-2 was proposed and studied. This macrolide may be synthesised in 5-6 steps from three building blocks. Good accessibility of building blocks from „chiral pool“ is the advantage of this approach. An effective und economical syntheses (in 7-8 steps) of all building blocks was developed.

The coupling of building blocks was also studied. The coupling for two building blocks was possible in good yield. The subsequent coupling with the sugar-derived building block did not lead to desired product and could not be used for further transformations. The coupling of sugar derived building block with different alkenyl- and alkynyllithium derivatives was also studied.